Department of Energy

ROCKY FLATS FIELD OFFICE
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99-DOE-01870

JUN 23 1999

Mr. Steve Gunderson
Rocky Flats Cleanup Agreement Project Coordinator
Hazardous Materials and Waste Management Division
Colorado Department of Public Health and Environment
4300 Cherry Creek Drive South
Denver, CO 80222-1530

Dear Mr. Gunderson:

In your approval letter of the Building 779 Decommissioning Operations Plan (DOP) dated February 6, 1998, it is stated that demolition plans must be submitted for your approval and public comment prior to their execution. Because the original DOP lacked sufficient detail on the demolition of the facility, we are submitting this modification to the DOP for your agency's final review concurrent with a 30-day public comment period. This modification to the DOP has been generated with input from members of your staff and the U.S. Environmental Protection Agency, Region VIII.

Questions regarding this letter can be directed to me at (303) 966-5918 or David Nickless at (303) 966-5221.

Sincerely,

Joseph A. Legare
Assistant Manager
for Environment and Infrastructure

Enclosure





1/29

cc: w/Encl.:
Administrative Records, 116
T. Rehder, EPA, Region VIII

cc: w/o Encl.:
A. Parker, K-H
B. Mathis, K-H

DWRC Denver West Remediation and Construction, L.L.C.
*. . . restoring the environment*

# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE (RFETS)

# MODIFICATION TO THE 779 CLUSTER DECOMMISSIONING OPERATIONS PLAN

# FOR DEMOLITION OF THE 779 CLUSTER

April 1999

REVIEWED FOR CLASSIFICATION/UCNI
By [signature] (ANL)
Date 5/6/99

## Table of Contents

# 1. PURPOSE

The purpose of this document is to describe the activities necessary to safely demolish Building 779, 782 and the associated out buildings in the 779 Cluster. This document will be submitted as a modification to the 779 Cluster Decommissioning Operations Plan (DOP).

# 2. THE 779 CLUSTER DESCRIPTION

The following subsections describe a brief background for each building located in the 779 Cluster as shown in Appendix 1.

## 2.1 Building 779

Building 779 consists of the original two-story building and two additions. The original building was built in 1965, Annex 779-A was constructed in 1968, and Annex 779-B was constructed in 1973.

The facility is roughly an L-shape. The north-south leg is 161 ft. wide and 214 ft. long. The east-west leg is 62 ft. wide and 101 ft. long. At its highest point, the building is 27 feet high.

Three types of structural framing members are used in Building 779. Vertical concrete columns, cast-in-place and reinforced, 10 inches by 14 to 16 inches rectangular, rest on slab footings. Structural steel columns, 8 inches deep, wide flange I-beams encased in concrete, support an exterior passageway and an exterior wall of the original building. Concrete block pilasters, 16 inches by 16 inches, reinforced with steel, are used in the single-story portion of the original building.

Exterior walls of Building 779 are hollow concrete block except for the 12 inch thick, poured - in-place reinforced wall of the storage vault and the metal stud and siding on a storage area on the east side of the first addition. Concrete block walls are 10 inches to 12 inches thick for the first floor and 8 inches thick for the second floor. There is horizontal trussed wire reinforcement in both the exterior and interior hollow core concrete block walls. There is no vertical reinforcement in the concrete block walls. Walls are insulated with either perlite fill between cavities or 2 inch blanket insulation. Outer surfaces of the blocks are painted. Most of the interior walls in the building are painted concrete block. Storage vault walls, which are 12 inch thick, reinforced concrete, are also painted.

First floor slabs in Building 779 are poured-in-place, reinforced concrete 6 to 8 inches thick. The second floor slab in the original building is 3.5 inch thick reinforced concrete on concrete joists supported by concrete beams. The second floor slab of the second edition is 8 inch thick reinforced concrete on concrete joists supported by concrete beams.

Three different roof systems are used on Building 779. The single story portion of the original building is structural steel with 18 gauge steel decking, insulation and composite roofing. The two-story portion of the original building and the second addition is a poured-in-place, reinforced concrete slab on concrete joists, supported by concrete beams. The original building has insulation and composite roofing, whereas the second addition has 2 inches foamed-in-place urethane and silicone rubber roofing. The first addition roof consists of precast concrete tees with 2 inches of lightweight concrete, 4 inches of perlite and elasteromic roofing.

### 2.2 Building 782

Constructed in 1973, Building 782 served as a second filter plenum for Building 779. The building is 100 feet long, 61.75 feet wide and 15.75 feet high. Walls are 6 inch thick, precast, reinforced concrete panel keyed in place by 8 inch thick concrete columns that vary from 14 to 24 inches wide. There are no interior walls. The roof consists of precast, reinforced concrete twin tees with a minimum of 2 inches of composite cast-in-place, stone aggregate topping.

There is one large pit at the west side of the building that holds a fire water deluge tank and provides access through the duct tunnel to Building 779. The underground duct tunnel extends from the southeast corner of Building 779 to Building 782. The tunnel is 48 feet long, 10.75 feet wide and 12 feet high. The walls, roof and floor are 12 inch thick reinforced concrete. The top of the roof slab is approximately 3 feet below grade.

### 2.3 Building 727

Constructed in 1973, Building 727 is a one-story structure that is used to house an emergency diesel generator. The building is 24 feet long by 16 feet wide and 12 feet high. The walls are 8 inch thick concrete block. The roof is 5 inch thick reinforced concrete slab covered by asphalt-gravel roofing material.

### 2.4 Building 780, 780A, and 780B

Building 780 is a corrugated metal building that is 8 feet wide by 16 feet long and 10.25 feet high resting on a reinforced concrete slab. The roof is sheet metal.

Building 780A is a pre-manufactured corrugated metal building 8 feet wide by 12 feet long and 9 feet high. It has plywood flooring and rests on 4" x 4" wooden skids.

Building 780B is a corrugated metal building that is 10 feet wide by 11 feet long and has a sloped roof that is 9.25 feet at its highest point. It rests on the same concrete slab as Building 780.

## 2.5 Cooling Towers System (Buildings 783, 784, 785, 786, and 787)

The Cooling Tower System consists of Building 783 (pump house) and eleven modular cooling water recirculation units identified as 784A, 784B, 784C 784D, 785, 786A, 786B, 787A, 787B, 787C, and 787D.

Building 783 is constructed of aluminum and steel pedestals attached to a reinforced concrete slab foundation. It is 21 feet wide and 24.5 feet long. The sloped roof is approximately 15 feet high at its highest point. The walls and roof are aluminum panels attached to a channel iron and I-beam framework.

The cooling water towers range from 7.25 feet to 9.25 feet wide by 18 feet long by 16.25 high. They are constructed of aluminum and steel mounted on reinforced concrete pedestals on a reinforced concrete foundation. A catwalk system, constructed of grating, I-beams and ladders provides access to the towers.

## 3. PREREQUISITES TO BUILDING DEMOLITION

The condition of the 779 Cluster prior to demolition will be as follows:

- The buildings will be isolated from all Site utilities.
- The final closeout radiological survey of the 779 Cluster will be completed for each individual building or areas within the buildings and reviewed by DOE and the Lead Regulatory Authority (LRA) in accordance with the 779 Cluster DOP. The closeout radiological survey will demonstrate that the 779 Cluster structures and areas within the structures (interior and exterior) meet radiological release criteria. Any components or walls not releasable from a radiological standpoint will be removed and disposed of individually prior to the total demolition of the building. If contamination remains on the floor slab of Building 779, negotiations will ensue with RMRS, K-H, DOE and CDPHE to determine the final disposition of the identified contaminate.
- The following systems will be removed from the buildings or areas within the buildings:
  - Zone I (Glovebox) ventilation, Zone II (Building) ventilation,
  - House vacuum,
  - Process piping,
  - Electrical distribution,
  - Alarm systems, Filter plenums,
  - Control room,
  - Emergency diesel and support systems, and
- Asbestos containing material will be removed from each facility.
- The buildings will be characterized and will not contain any hazardous substances. Analysis of the paint for RCRA metals will be performed using Toxicity Characteristic Leaching Procedure (TCLP). No RCRA metals will be permitted above the Land Disposal Regulation (LDR) thresholds.
- All below grade openings will be plugged, capped, blind flanged or covered with an appropriate protective covering.

The scope of the demolition activities covers the disassembly of the 779 Cluster structures to the slab, minimal segregation of building materials, as necessary, and relocation of materials for recycling, re-use or off-site disposal. Most of the bulk building structural material is expected to be released in accordance with the radiological closeout criteria and removed from the Site for recycle and disposal, as appropriate. The materials will be managed as either sanitary waste in accordance with the 779 DOP or in accordance with an approved Rocky Flats Cleanup Agreement Standard Operating Procedure (RSOP).

The LRA will be advised of the specific methods to be used and will be provided access to review work packages prior to demolition. Initiation of demolition operations is dependent upon successful completion of a Kaiser-Hill Management Review with CDPH&E (LRA) involvement.

The project will not disturb any soil around the building, except in an incidental manner, e.g., impressions from heavy material or equipment resting on and compressing the soil. Common types of mechanical demolition methods and equipment will be used. These methods are identified and described in Section 5, Demolition Techniques; however, the demolition will be performed and exact methods determined by an experienced and qualified demolition contractor.

Although the 779 Cluster will be demonstrated to meet radiological and non-radiological release criteria, air samples will be obtained to supplement the RFETS boundary monitoring system in accordance with the *Building 779 Cluster Demolition Project Air Monitoring Plan, March 1999* (Appendix 2). In addition, qualified radiation control technicians will be available to perform random checks of the demolition debris, as directed by the Project's Radiological Engineer.

After demolition is complete, only the concrete floor slab that has concrete curbs and equipment pedestals protruding above the slab will remain at the Building 779 site. The soil and below grade structures will be assessed as necessary for below-grade contamination at a later time.

## 4. BUILDING DEMOLITION APPROACH

A qualified and experienced demolition contractor shall perform the 779 Cluster demolition in accordance with industry practices and site requirements. A competent structural engineer and safety professional will continually monitor demolition activities to ensure that the demolition activities are conducted safely. Protection of the existing utilities and installation of safety nets will be accomplished at appropriate steps.

Building structural demolition may employ large mechanical equipment including a wrecking ball/crane, a tracked excavator equipped with a hydraulic hoe-ram and grapple, and front-end loaders to demolish, size reduce, segregate, and load the concrete, steel and other building materials into the structural waste containers. . A detailed description of various demolition technologies is provided in Section 5, any of which may be used in the appropriate situation. Cutting torches will be used to remove rebar extending above the foundations and structural metals, as necessary, to support lading of rubble, attached to concrete. All torch cutting will be performed in accordance with the project specific Health and Safety Plan and Hot Work Permits. Structural steel will be segregated from the debris, as required, and placed into roll-offs using a grapple. Fugitive dust will be controlled as described in Section 7.1, Environmental Protection.

The primary demolition steps and mechanical techniques recommended for dismantling and segmenting the buildings are provided below. The demolition approach listed in the following sections may be modified based on the most current facility conditions and recommendations of the subcontractors' competent structural engineer.

### 4.1 Building 779

Demolition of Building 779 will begin in an area specified in the Integrated Work Control Package (IWCP). Waste containers will be staged as close to the demolition area as possible and will move in the direction of the demolition work. Hydraulic excavators with grapples, shears, breakers, pulverizers or other appropriate attachments, along with a crane and wrecking ball will be used to demolish the building.

The excavators will be used for general and more precise demolition. Demolition performed adjacent to streets, buildings and other structures will be conducted in a manner as to bring the Building 779 debris in upon itself and away from the surrounding areas of concern. Hydraulic breakers and the crane with the wrecking ball will be used to weaken (if needed) the thicker reinforced walls in order to pull Building 779 in upon itself or the building footprint. The wrecking ball will employ the vertical drop method in order to keep debris within the building footprint.

Prior to demolition of the overhead passage between Building 779 and Building 777, shoring will be placed under the walkway to temporarily support the structure. Scaffolding will be built to provide access to the sides of the bridge just east of the gas and steam lines. The walkway will then be cut free to provide a clean break when being removed.

Building demolition debris will be size reduced (weight and dimension) to fit into a roll-off container. Demolition debris will be loaded into the containers using excavators, loaders, all terrain hoists, etc.

### 4.2 Building 782

Demolition of Building 782 will begin in an area specified in the Integrated Work Control Package (IWCP). Hydraulic excavators with grapples, shears, breakers, pulverizers or other appropriate attachments, along with a crane and wrecking ball will be used to demolish the building.

The excavators will be used for general and more precise demolition. Demolition next to streets, buildings and other structures will be performed in a manner as to bring the Building 782 debris in upon itself and away from the surrounding areas of concern. Hydraulic breakers and the crane with the wrecking ball will be used to weaken (if needed) the thicker reinforced walls in order to pull Building 782 in upon itself or the building footprint. The wrecking ball will employ the vertical drop method in order to keep debris within the building footprint.

Building demolition debris will be size reduced (weight and dimension) to fit into a roll-off container. Demolition debris will be loaded into the containers using excavators, loaders, all terrain hoists, etc.

### 4.3 Building 727

The primary equipment to be used for this building will include an excavator with a hoe-ram or grapple and a front-end loader to load the debris. Demolition will be performed in the same manner as Building 782. Demolition materials will be staged in the northeast area of the 779 Cluster until loaded and transported off site.

### 4.4 Cooling Tower System (Buildings 783, 784, 785, 786, and 787)

Building 783 will be removed using an excavator with a grapple and a front-end loader to load the debris for transport off site. The individual cooling towers will be loaded on a flat bed trailer using a crane and released as equipment to Plant Maintenance for disposition. The remaining superstructure will size reduced and loaded for transport off site.

### 4.5 Waste Management

Approximately 159,000 cubic feet of structural debris will be generated during the demolition of the above structures. This will require approximately 300 20- cubic yard containers to transport the debris to the storage pile or repository. The buildings will be removed down to the foundations leaving the grade slab and equipment pedestals. All anchor bolts and/or other protrusions on the equipment pedestals will be removed within 1/16" of the surface. Pits,

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sumps, trenches or other openings in the grade slab will be plugged, capped or covered with a watertight cover capable of supporting foot traffic.

The waste generated from the demolition of the 779 Cluster will be managed and segregated in accordance with the 779 DOP and Project Waste Management Plan. Most of the bulk building structural material is expected to be released in accordance with the radiological closeout criteria and removed from the Site for recycle and disposal, as appropriate. The materials will be managed as either sanitary waste in accordance with the 779 DOP or in accordance with an approved Rocky Flats Cleanup Agreement Standard Operating Procedure (RSOP).

# 5. DEMOLITION TECHNIQUES

## 5.1 Excavator Mounted Attachments

*Controlled demolition:* refers to the use of various attachments mounted on an excavator to disassemble a structure. Basic attachments, which operate off a hydraulic system, include such items as concrete pulverizers, shears, grapples and rams. These attachments perform the following functions:

- Pulverizer: crushes concrete and separates rebar and encased steel beams;
- Shears: sever concrete, metals, structural steel, wood, rubber and plastic;
- Grapple: serves as an all-purpose tool for demolition and materials handling;
- Ram: demolish concrete structures(up to 6 feet thick) using a moil or chisel point

Excavator mounted attachments are recommended for a wide variety of demolition projects. Concrete pulverizer jaws are capable of separating rebar and embedded steel beams from concrete. Plate shears are available for clean cutting steel plate up to 1¼" thick. The plate shears are more applicable to decommissioning and can be used to dismantle above and below ground tanks and to cut separated rebar and concrete. Grapples are versatile and provide a wide range of uses, such as demolition, scrap recycling, and materials handling (e.g. loading rebar, crushed concrete). Grapples can be used as an alternative to loaders and buckets as tools for demolition cleanup.

The ram (both air-powered and hydraulic) is a resistance driven tool in that it begins operating as soon as the chisel point touches the workpiece and stops as soon as the chisel is lifted or clears the workpiece. Air powered rams can be used for lightly reinforced concrete that is less than 2 feet thick. Hydraulic rams can be used for demolition of much larger sections of concrete (up to 6 feet thick) and are available with heads capable of delivering 7,000 – 10,000 ft/lb of energy per blow.

## 5.2 Wrecking Ball

The wrecking ball is typically used for demolishing nonreinforced or lightly reinforced concrete structures less than 3 feet thick. The equipment consists of a 2-5 ton ball suspended from a crane boom. The preferred method of use is to raise the ball with a crane 10 – 20 feet above the structure and release the cable brake, allowing the ball to drop onto the target surface. This method achieves good fragmentation of the structure and maintains maximum control of the ball after impact.

## 5.3 Diamond Wire Cutting

Diamond wire cutting involves a series of guide pulleys that draws a loop of multi strand wire strung with a series of diamond beads and spacers through a cut. The length of wire that is required for a cut is obtained by assembling standard length sections of wire end-to-end using

screwed sleeves. A contact tension is kept on the wire. This force, in combination with the spinning wire, cuts a path through concrete and rebar. Linear wire speed is adjustable for 0-5,900 ft/min, and wire tension can be adjusted from 1 to 330 lbs. The wire is wrapped around the object to be cut and tension is applied. If an internal cut is required (e.g. doorway), core drilling is necessary, and the wire is fed through the holes. Almost any thickness can be cut with this technique.

One of the major benefits of the wire saw is the flexibility of the pulley system, which allows it to cut unusual configurations. This flexibility also allows easy and safe cutting difficult access areas without moving obstructions. The wire saw also lends itself to remote cutting in hazardous, radioactive or underwater environments. Water is used not only for cooling and lubricating purposes, but also for removing slurry from the kerf. This water can be treated and recycled, and the slurry, if contaminated, must be properly disposed of. Contaminated water will be collected and treated within the 779 Cluster, Building 891 or in Building 374 in accordance with the 779 DOP.

## 6. WORK CONTROL AND AUTHORIZATION

Work control and authorization will be managed using the organization identified in Section 2.0 of the 779 Decommissioning Operations Plan (DOP).

Demolition activities will comply with the 779 Cluster DOP and with RFETS site-specific procedures, such as Integrated Work Control Packages (IWCP). The RFETS Integrated Work Control Program (IWCP) incorporates the requirement to include Integrated Safety Management (ISM) principles in accomplishing demolition activities. The ISM principles ensure workers involvement in the planning, hazard identifications and implementation of the demolition activities. The IWCP review process evaluates the activity for worker safety, hazard identification, mitigation measures and compliance with the 779 Cluster authorization basis documents.

Any project personnel have the authority to stop work if an unsafe condition is observed. Restart authority for any work stoppage, for any reason, lies within the Project Work Authorization Team (WAT) Manager.

Security requirements for this project are identified in the Special Security Plan W 99-002, for the 779 Cluster, dated February 1, 1999. A security island has been established within the PA that allows free access to people within the 779 Cluster security island fence (Isolation Area). Escorts are required to transport uncleared personnel from Portal 1 to the Isolation Area around the 779 Cluster. Project activities involving movement of equipment and material into and out of the 779 Cluster will have appropriate security measures incorporated into their work plans.

# 7. ENVIRONMENTAL, HEALTH AND SAFETY CONTROLS

## 7.1 Environmental Protection

The Subcontractor will minimize environmental impacts resulting from demolition through the use of procedures designed to prevent uncontrolled releases of waste, control water run-on and run-off, and minimize fugitive dust emissions. All wastes generated during demolition will be characterized and packaged in compliance with project-specific ARARs (779 Cluster DOP Section 9.3), relevant RFETS Waste Management Procedures (RFETS procedures reflect applicable DOE and Colorado Hazardous Waste Act (CHWA) requirements), and applicable Waste Acceptance Criteria (WAC).

## 7.2 Air Emissions Control

Fugitive dust emissions will be controlled by using the following methodologies:

- Controlled water spray to minimize fugitive dust emissions during demolition.
- Building debris will be loaded into waste roll-off containers that will be covered to control fugitive dust emissions.
- Materials deposited on paved haul roads as a result of the demolition project will be removed if the spread of dust from these deposits creates a nuisance in the surrounding areas.
- Demolition activities will be terminated during periods of high winds.

The existing Site Radioactive Ambient Air Monitoring Program (RAAMP) sampler network will be used for ambient air monitoring during demolition. The RAAMP sampler network continuously monitors airborne dispersion of radioactive materials from the Site into the surrounding environment. The existing monitoring will be supplemented by more frequent sampling using five existing fixed samplers in the immediate vicinity of and surrounding the 779 Cluster.

The 779 Cluster Demolition Project Air Monitoring Plan identifies the enhanced monitoring samplers, defines the action levels, and lays out the filter collection and analysis protocol. A baseline analysis will be conducted prior to the commencement of demolition activities. The five samplers will be collected and analyzed weekly. The alpha/beta screening results from these samplers will be compared on a weekly basis to two pre-defined concentration levels: the 0.1 mrem, Level 1, and 5.0 mrem, Level 2, values. Level 1 data is used as an initial screen to ensure that radionuclide emissions from the project are not higher than expected while Level 2 data is used to ensure that the Site 10 mrem per year regulatory standard is not exceeded.

The 779 Cluster Demolition Project is not expected to warrant radionuclide air monitoring beyond the enhanced ambient air sampling described above. This determination will be based on The Close-Out Radiological Survey Plan for Building 779 Cluster. The Close-Out Radiological Survey Plan for Building 779 defines the methods used to verify that radioactive contamination in Building 779 meets unrestricted release criteria levels. If portions of Building

779 do not meet the unrestricted release criteria, the area will be decontaminated or removed in accordance with the DOP prior to demolition.

The use of water collection equipment is not expected to be necessary. Stormwater-related run-off will be controlled through the use of standard construction industry accepted Best Management Practices such as silt fencing, hay bales, pigs, etc.

Daily inspections of the demolition equipment will be performed to verify that equipment fluid leaks are detected as early as possible. This inspection practice will assure that there are no significant equipment fluid spills for the duration of the project.

Precautions will be taken to ensure compliance with the Migratory Bird Act, which prohibits destruction of birds or their nests, active or inactive without a permit. Building surveys for such nests in the 779 Cluster will be conducted prior to demolition.

### 7.3 Health and Safety

Health and Safety practices are identified in a project specific Heath and Safety Plans (HASP). The HASP defines mechanisms and procedures to identify, mitigate, and control/eliminate potential safety, health and environmental hazards associated with the demolition of the 779 Cluster. Activity Hazard Analyses (AHAs) or Job Hazard Analyses (JHAs) address specific hazards associated with the demolition activities. The HASP also identifies required training via a *'779 Cluster Demolition Project H&S Training Matrix.'* Individual workers must comply with the training requirements listed on the matrix for specific activities, including demolition.

No tasks (excluding walkdowns, general work tasks, surveillance, inspections, and other tasks specified by the Project Health and Safety Manager) will be performed until an AHA/JHA has been written and approved. The AHA/JHA is task specific and addresses the hazards for each task step, controls to be used, special equipment needs, training, and any necessary monitoring.

The Project Health and Safety Manager, together with radiological personnel will assess the need for employee personnel and area monitoring. Such monitoring may include noise, heat stress, chemical, and radiological hazards. Health and Safety personnel will assist in the full time management of demolition hazards.

Known Hazards: Anticipated hazards associated with this project are physical hazards (e.g., noise, muscles strains, cuts/abrasions, electrical shock, slips/trips, use of heavy equipment, dropped loads, and falls from elevated surfaces). These anticipated hazards are associated working with portable hand tools, working at heights, and using heavy machinery. The HASP and associated AHA/JHAs address methods to control these hazards.

Lead paint has been used on the interior surfaces of Building 779. Analysis of the paint for RCRA metals was performed using TCLP and documented in the Metals in Paint Characterization Report, Building 779 Cluster, August 6, 1998. No RCRA metals were detected above the LDR thresholds. During demolition, these painted surfaces are kept wet to

prevent fugitive dust releases and precautions are taken to control and contain the run-off of excess water through the use of earthen dams and hay bales.

Work activities will be stopped if any unanticipated hazard is discovered or a known or potential hazard is present at a level exceeding established control limits. Appropriate notifications and mitigation of the hazard encountered will be pursued.

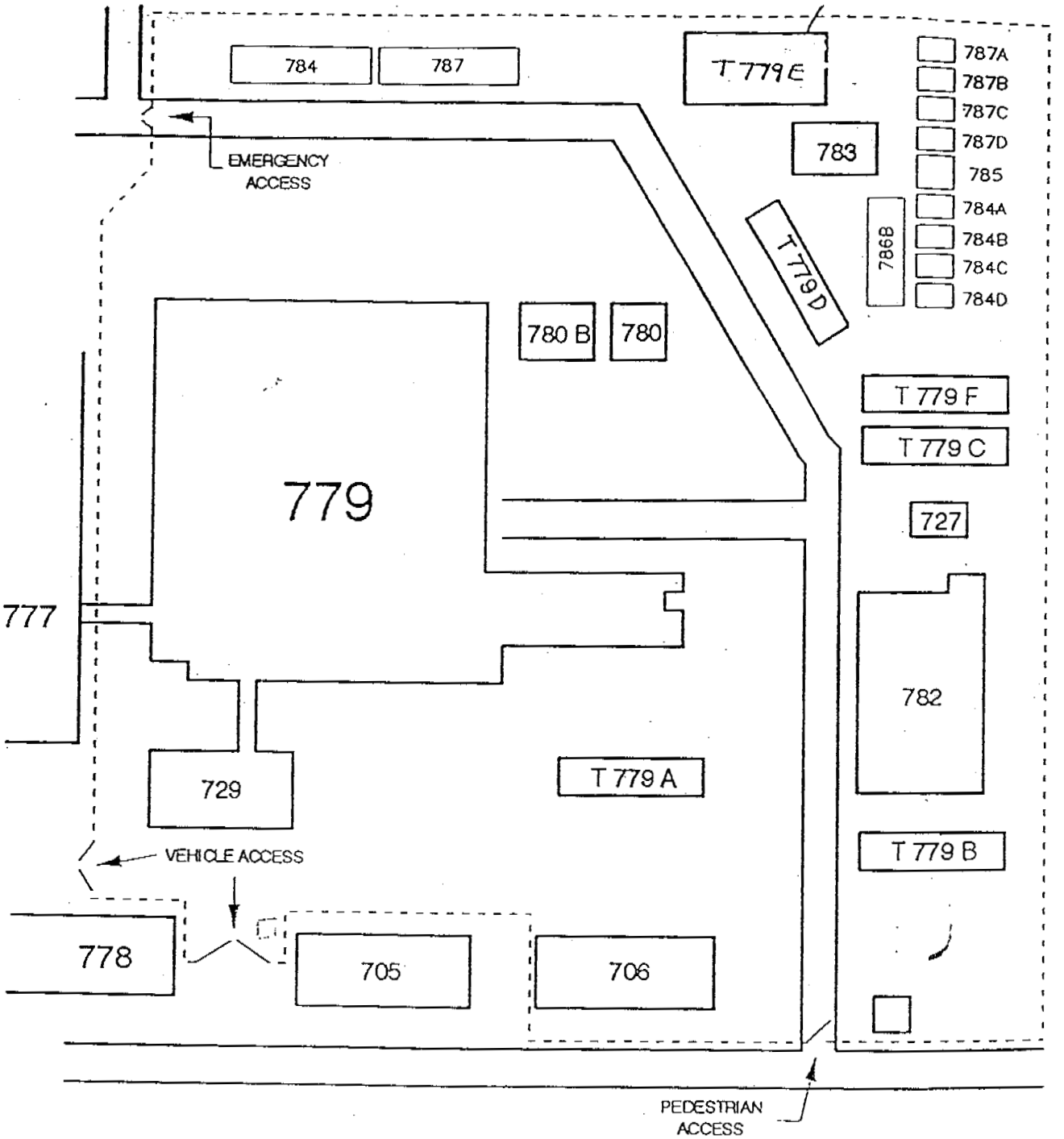
The requirements for the following plans have been incorporated into the HASP or will be issued as separate documents.

- Lead Compliance Plan
- Fall Protection Plan
- SHP
- Critical Lift Plan
- Preliminary Hazard Analysis

## 7.4 Completion Report

At the end of the 779 Cluster Demolition Project, a Project Completion Report will be prepared. This report will include a listing of wastes removed from the 779 Cluster and characterization data that contributed to the final forms and volumes of wastes generated during demolition of the building.

# APPENDIX 1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# Building 779 Cluster Demolition Project
# Air Monitoring Plan

March 1999

Rocky Flats Environmental Technology Site

## 1.0 INTRODUCTION

The Site is subject to Title 40 of the Code of Federal Regulations (CFR), Part 61, Subpart H, which requires that emissions of radionuclides to the ambient air from the Site not exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent (EDE) of 10 millirem (mrem). To gather data related to this standard and as required by Department of Energy (DOE) Order 5400.1, the Site maintains an ambient air monitoring network that continuously collects air samples at various locations on-Site, along the Site perimeter, and in the surrounding communities.

This document outlines project-specific environmental air monitoring that will be performed in conjunction with the Building 779 Cluster demolition project. The existing Site Radioactive Ambient Air Monitoring Program (RAAMP) sampler network will be utilized for ambient air monitoring during the Building 779 Cluster demolition. The RAAMP sampler network continuously monitors airborne dispersion of radioactive materials from the Site into the surrounding environment. Thirty-six samplers comprise the RAAMP network. Twelve of these samplers are deployed at the Site perimeter and are used to confirm Site compliance with the 10 millirem standard mandated in 40 CFR 61, Subpart H. Filters from these 12 RAAMP samplers located at the Site perimeter and from one on-Site sampler near the 903 Pad are collected and analyzed monthly for uranium, plutonium, and americium isotopes.

The Building 779 Cluster demolition phase is not expected to generate detectable radionuclide emissions. This determination is based on the following:

- Contamination and contaminated materials will be removed within the intact building shells with HEPA filtered exhaust.

- After all radioactive materials have been removed from the buildings a release survey will be performed of the floors, interior walls, ceilings, exterior walls, and the roofs to ensure that the buildings may be released for unrestricted demolition. If the surveys show that portions of the Building 779 Cluster do not meet the unrestricted release criteria, the area will be decontaminated or removed prior to demolition.

However, to ensure that a significant, though improbable release can be detected, the following alternative enhanced radioactive ambient air monitoring program will be implemented during the demolition phase of previously contaminated buildings within the Building 779 Cluster.

## 2.0 ALTERNATIVE ENHANCED AIR MONITORING FOR THE BUILDING 779 CLUSTER DEMOLITION PROJECT

### Ambient Air Sampling

Enhanced ambient air sampling will be based on the existing RAAMP sampling network at the Site, with more frequent filter exchanges and sample analysis performed in the immediate vicinity of the Building 779 Cluster. For the demolition project, three ambient air-sampling groups have been designated:

- Project-specific Sampling: Filters from five samplers in the immediate vicinity around the Building 779 Cluster (S-101, S-102, S-103, S-104, and S-121) will be collected and analyzed weekly for a two week period prior to demolition activities, weekly during demolition activities, and on the week following demolition activities. Filter cartridges will be changed weekly and delivered to the on-Site modular laboratory where the filter that collects particles less than 10 micrometers in diameter will be removed from the cartridge and screened for gross alpha/beta contamination. The filters collected during demolition will also be composited on a monthly basis and analyzed for specific radioactive isotopes.

  The alpha/beta screening results from the five project-specific sampling sites will be compared on a weekly basis to two pre-defined concentration levels (see Tables 1 and 2 below). Level 1 will correspond to a radionuclide dose of 0.1 mrem per year to the most impacted public receptor based on CAP88 PC dispersion model results, assuming Pu-239 is the isotope responsible for the activity. Level 1 will be used as an initial screen to ensure that radionuclide emissions from the project are not higher than expected. Level 2 will approximate a 5.0 mrem per year dose at the Site perimeter if emissions were to continue at that level for the duration of the project. Level 2 is used to ensure that the Site does not approach or exceed the 10 mrem per year regulatory standard.

Table 1 - Level 1 (picocuries per cubic meter [$pCi/m^3$])

| Sampler Number | Concentration |
|---|---|
| S-101 | 4.85E-02 |
| S-102 | 8.09E-03 |
| S-103 | 5.37E-03 |
| S-104 | 1.10E-02 |
| S-121 | 4.80E-03 |

Table 2 - Level 2 ($pCi/m^3$)

| Sampler Number | Concentration |
|---|---|
| S-101 | 2.42 |
| S-102 | 0.40 |
| S-103 | 0.27 |
| S-104 | 0.55 |
| S-121 | 0.24 |

In addition, if there is a suspected radionuclide release, such as would be indicated by anomalies discovered in the rubble, AQM must be notified by responsible project personnel as soon as possible, and filters from the five project-specific samplers will be immediately collected and submitted for alpha/beta screens. If the results of the alpha/beta screens exceed concentration levels in Table 1, the filters will be submitted for isotopic analysis on an expedited schedule. In addition, archived samples from other RAAMP samplers may also be screened or submitted for isotopic characterization, should results warrant such action.

- Perimeter Sampling: Filters from 12 RAAMP samplers located at the Site perimeter and one on-Site sampler are collected and analyzed monthly for radioactive constituents (isotopic breakdown). This collection and analysis frequency is the normal protocol for these samplers, and will continue for the 13 monitors for the duration of the project.

- Other RAAMP Sampling: Filter cartridges from the remaining on-Site and community RAAMP samplers will be collected monthly throughout the Building 779 Cluster demolition project and archived for future analysis, if necessary.

## 3.0 DATA ANALYSIS

Weekly alpha/beta screening results from the five project-specific monitors will be converted to units of activity per volume of air drawn through the filter (e.g., $pCi/m^3$) based on the expected isotopic composition of materials to be disturbed. Results of alpha/beta screening will be available and communicated to project personnel approximately 3 workdays following weekly submittal of filters to the laboratory. The screening concentrations will be compared and plotted each week against the two concentration levels identified above.

For radionuclide emissions corresponding to concentration level 1 or less, enhanced monitoring will continue, with weekly filters being screened for alpha/beta contamination and composited monthly for isotopic analysis. If concentration level 1 is exceeded, weekly filters from the five project-specific samplers will be submitted for isotopic analyses on an expedited schedule, and Air Quality Management personnel will meet with project personnel to evaluate the suspected release and to determine what additional sample collection and analysis is warranted. If concentration level 2 is reached, weekly filters from the five project-specific samplers will be submitted for isotopic analyses on an expedited schedule, and Air Quality Management personnel will meet with project personnel to reassess project parameters and implement mitigative measures to reduce future emissions. In addition, archived samples from other RAAMP samplers may also be screened or submitted for isotopic characterization.

The results of routine isotopic analyses from ambient air samples will be available and communicated to project personnel approximately six weeks following removal of filters from the samplers. The results of expedited isotopic analyses will be available and communicated to project personnel approximately two weeks following filter alpha/beta screens. The isotopic data will quantify the various uranium, plutonium, and americium isotopes on the filters in units of activity per volume of airflow through the filters ($pCi/m^3$).

## 4.0 REFERENCES


1. Kaiser-Hill Company, L.L.C. *Radioactive Ambient Air Monitoring*, Procedure No. 4-S36-ENV-AQ.13. In: Air Quality Procedures Manual No. 4-21000-AIR-001, March 31, 1995.

2. Rocky Flats Environmental Technology Site. *Statement of Work for Analytical Measurements, General Laboratory Requirements*, Module GR01-A, December 10, 1996.

3. Rocky Flats Environmental Technology Site. *Statement of Work for Analytical Measurements, Isotopic Determinations by Alpha Spectrometry*, Module RC01-A, January 22, 1997.

4. Kaiser-Hill Company, L.L.C. *Ambient TSP/$PM_{10}$ Air Particulate Sampling High Volume Method*, Procedure No. AP.09. In: Air Quality Procedures Manual No. 4-21000-AIR-001, October 1, 1991.

5. Rocky Flats Environmental Technology Site. Denver West Remediation and Construction, LLC. *Modification to the 779 Cluster Decommissioning Operations Plan; For Demolition of the Building 779 Cluster*, March 1999.

6. Rocky Flats Environmental Technology Site. *Decommissioning Operations Plan for the 779 Cluster Interim Measure/Interim Remedial Action*, RF/RMRS-97-085.UN, February 1998.

**REVIEW COMMENTS FOR 779 DEMOLITION PLAN, 3/30/99**

## Edd Kray, CDPHE

1. On Page 3, a map or diagram of the various buildings would be valuable.
2. On Page 3, Section 3, bullet 2: change survey "has been" completed to "will be."
3. On Page 6, Section 4.6: cite (reinforce) compliance with 779 DOP and Waste Management Plan requirements for segregation and management of debris.
4. New: What is the anticipated schedule for this project?
5. New: Add a Section on training of demo "subs."
6. New: Describe work oversight to ensure quality and safety: who, when, and by what subs?

**Response**

1. A map of the 779 Cluster has been added to the Demolition Plan as Appendix 1.
2. Comment incorporated.
3. Added 2nd paragraph to Section 4.5.
4. The current schedule is to begin the demolition activities in August 1999 and complete by September 1999.
5. A clarification to the subcontractor training was added to the 1st paragraph of Section 7.3.
6. DWRC is responsible for oversight of the lower tier subcontractor who will perform the actual demolition of Building 779. DWRC is also responsible for ensuring that all quality and safety concerns are addressed in an on-going process throughout the duration of the project. RMRS will have oversight of DWRC activities as the Prime Contractor.

## Mark Aguilar, EPA

1. Air Sampling: The assumption is that the entire building will be free-releasable and that the existing site monitoring network will provide sufficient assurance that contamination will not enter the environment or leave the Site. We are in agreement with this assumption. However, if there is contamination (i.e., on exterior walls) that cannot be decon'd below the Reg. Guide 1.86 release limits, then we will need to meet to determine a strategy that will provide an additional level of safety such as an additional monitoring network surrounding the 779 Cluster, or something of that nature.
   - Please add a statement in the plan that indicates this contingency. A good place may be in Section 3 where you discuss the Site monitoring network.

**Response**

The present strategy is to remove contamination that cannot be decontaminated even if that contamination is identified on exterior walls. This is a prerequisite to demolition. In addition, a note was added to Section 3 to indicate removal of items not releasable prior to demolition.

## Laura Brooks, Kaiser-Hill

1. I found the discussion on debris disposition confusing. I thought the original DOP stated that all demolition waste would be removed off-site. The scope of the demolition activities (addressed in this Demolition Plan) covers...the minimal segregation of building materials, as necessary, and relocation of materials for recycling, reuse or off-site disposal. It is unclear in the document what material will be recycled or reused. Is that supposed to mean building rubble? Or, may some of the demolition material be recycled and/or reused off Site? Is the recycling or reuse of material part of the modification to the 779 DOP?

**Response**

The Decommissioning Operations Plan For The 779 Cluster Interim Measure/Interim Remedial Action (779 DOP) does not commit, in totality, to off-site removal of demolition debris. Following is the level of commitment in the DOP: "Most of the bulk building structural material is expected to

be free released and will be removed from the Site for recycle and disposal as appropriate." This statement was designed for flexibility to use clean demolition debris on-site if the need arose.

Where ever possible and cost-effective, metal reinforcement material will be segregated from the concrete debris for recycle. Concrete rubble may be size reduced and stockpiled for re-use on-site. Discussions with the LRA have been ongoing regarding the use of non-contaminated building rubble as clean backfill at RFETS. The project is currently reviewing this option of disposal through a draft Rocky Flats Cleanup Agreement Standard Operating Procedure (RSOP). No modification to the DOP is intended since recycling and reuse of material has already been addressed at a level satisfactory to the LRA. However a statement was added to the Demolition Plan in Sections 3, 2nd paragraph and Section 4.5, 2nd paragraph that references the draft RSOP.

2. I was not clear on how the demolition debris would be dispositioned, e.g., Section 4.1 states that the debris will be size-reduced to fit into a roll-off container. But what happens to the debris after it is in the roll-off container? (See also Section 4.2)

**Response**
Reference Question 1.

3. Section 4.6 states the demolition debris will be transported to the storage pile or repository. It is unclear to me why a storage pile is needed because there is no other discussion on the need for a storage pile.

**Response**
Reference Question 1.

4. Have you had discussions with Karan North regarding the off-site disposal of this material?

**Response**
Discussions regarding the off-site disposal of demolition debris have occurred with DOE, RMRS Waste Management, Radiological Engineering and KH Integration Management.

5. In the second paragraph of Section 5.3, there is a statement that the water can be treated and recycled, and the slurry, if contaminated, must be properly disposed of. Where would this water be treated?

**Response**
The water will be treated within the 779 Cluster, Building 891, or in Building 374 in accordance with the 779 DOP. This information will be incorporated into Section 5.3, 2nd paragraph of the 779 Demolition Plan.

6. Previously we discussed whether this modification is a major or a minor modification. I have heard nothing new on this subject and was wondering what the last viewpoint is.

**Response**
The 729 Demolition Plan was considered a major modification by the LRA; the 779 Project believes that the 779 Cluster Demolition Plan will be considered a major modification.

## Carol Patnoe, Air Quality Management, K-H

1. Suggest that particulate emissions control measures be expanded and put under a separate heading. Control measures should include the following:
   - Controlled water spray will be utilized to minimize fugitive dust emissions during demolition activities.
   - Debris from the building 729 demolition will be loaded into waste roll-off containers that will be covered to control fugitive dust emissions.

- Material deposited on paved haul roads as a result of the Building 729 demolition project will be removed if the spread of dust from those deposits creates a nuisance in the surrounding area.
- Demolition activities will be terminated during periods of high wind.

**Response**
A new section (7.2 Air Emissions Control) was added to address these comments.

## Steve Nesta, Environmental, K-H

1. I have reviewed the modification to the 779 DOP for demolition of the 779 Cluster. My understanding is that this document supplements the existing DOP by specifically describing the activities needed to demolish Buildings 779, 782, and associated outbuildings in the Cluster. Buildings will be demolished to ground level; floor slabs and subsurface structures will remain in place. If this understanding is incorrect, please notify me immediately.
   - With regard to the NEPA documentation for the Project, I find that the project is adequately covered by the DOP and that no additions or amendments are necessary.
   - If the scope or decommissioning activities of the project vary from the current description, please contact me so that we can review the changes for compliance.

## Douglas Rosco, Safety & IH, K-H

- Safety and Health requirements specified in the HASP, no comment.

## Kevin Daniels, CPE&I, K-H

1. Pages 3 and 4, Section 3: In several places the Plan discusses meeting free-release criteria. Since the criteria used is not the standard free-release criteria, it may be better to say "release criteria" as set forth in the final survey plan.
2. Pages 4.1, Section 5: Rather than specifying where to begin and how to progress for demolition of the various buildings, why not state that the methodology will be specified in the IWCP. This will allow more flexibility if the subcontractor has a better method.

**Response**
1. Comment incorporated.
2. Comment incorporated.

## Eric Leonard, CPE&I, K-H

1. Page 3, Section 3, 4th bullet: I would remove the word "all." If there is some minimum disposal level or requirement that might be appropriate.
2. Page 5, Section 4.1, 1st sentence: End the sentence after "demolition of the building." Remove progress to the opposing exterior wall.
3. Page 5, Section 4.2, 3rd paragraph: Same as above.
4. Page 5, Section 4.1, 4th paragraph: Remove "all"...building demolition...
5. Page 6, Section 4.2, same as above.

**Response**
1. Comment incorporated.
2. Comment incorporated.
3. Comment incorporated.
4. Comment incorporated.
5. Comment incorporated.

## Duane Parsons, K-H

1. Page 2, Section 2.2, "There are no..." vs "Here are no..."
2. Page 3, Section 3, "...radiological survey..." as opposed to radiation. This occurs twice.
3. Page 4, Section 3, see 5.2.2.1 Building CRSP allows the slab to be contaminated if decon efforts fail. We can cover with sheet metal or the like.

4. Page 9, Section 7.1, same as above.

**Response**

1. Comment Incorporated.
2. Comment Incorporated.
3. The present strategy is to remove walls or above grade equipment that cannot be decontaminated. This is a prerequisite to demolition. A reasonable attempt will be made to remove contamination found on the slab using the requirements specified in the contract documents. If this is unsuccessful in removing the contamination then negotiations will ensue with RMRS, K-H, DOE and CDPHE to determine the final corrective action.
4. See response to 3.

## John Whiting, K-H Oversight

1. Page 1, Para 2.1, 2nd sentence, change "build" to "built"
2. Page 2, Para 2.2, 4th sentence, change "Here" to "There"
3. Page 3, Para 3, 2nd bullet, change to read, "...779 Cluster will have been completed for each...". The closeout radiological survey will demonstrate that the 779 Cluster structures and areas within...
4. 3rd bullet, change to read, "The following systems will have been removed..."
5. 4th bullet, change to read, "...material will have been removed..."
6. 5th bullet, change to read, "The buildings will have been fully characterized and found to not contain...". Analysis of the paint for RCRA metals will have been performed..."
7. 6th bullet, "All below grade openings will have been plugged..."
8. Page 4, Para 4, 2nd sentence, change to read, "...structural engineer will continually monitor demolition activities to ensure that the...conducted safely."
9. Page 6, has the decision been made yet about transportation off site? Question regarding the storage pile or repository?

**Response**

1. Comment incorporated.
2. Comment incorporated.
3. Comment incorporated, with the exception of the verb tense. The Demolition Plan is being written as a guiding document of "to do' items or tasks.
4. See response to comment 3.
5. See response to comment 3.
6. See response to comment 3.
7. See response to comment 3.
8. Comment incorporated.
9. The present strategy is to remove the waste materials to a sanitary landfill for disposal unless otherwise directed by 779 Project Management or K-H Integration Management.